(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 528 745 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **92500078.8**

(22) Date of filing : **15.06.92**

(51) Int. Cl.[5] : **D06F 69/02**, D06F 67/00, D06F 71/34, D06F 67/02

(30) Priority : **23.07.91 ES 9101712**

(43) Date of publication of application : **24.02.93 Bulletin 93/08**

(84) Designated Contracting States : **AT BE CH DE DK FR GB IT LI SE**

(71) Applicant : **GIRBAU, S.A.**
Ctra. de Manlleu, Km. 1
E-08500 Vic (Barcelona) (ES)

(72) Inventor : **Riba Romeva, Carles**
C. Marinada, 28E, 1o, 2a
E-08970 Sant Joan Despi, Barcelona (ES)
Inventor : **Sans Rovira, Ramon**
Cami Verinal, s/n
E-08551 Tona, Barcelona (ES)

(74) Representative : **Ponti Sales, Adelaida et al**
Paseo de Gracia, 33
E-08007 Barcelona (ES)

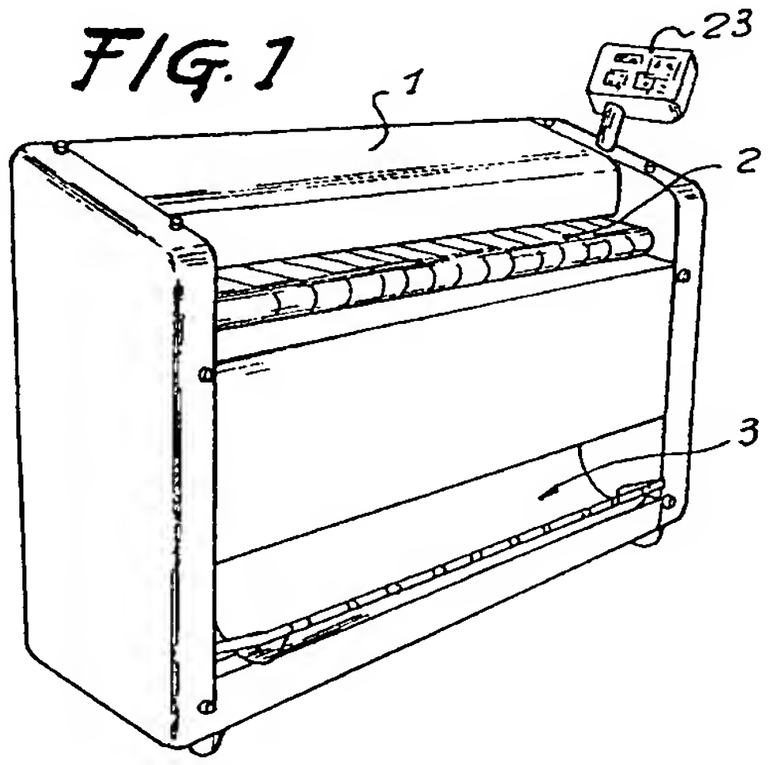
(54) Ironing machine.

(57) Ironing machine comprising an outer casing (1) which contains an ironing cylinder (4) provided with a heating system (5), a pressure cylinder (6), a plurality of textile bands (7) and means for control of the ironing temperature and speed, and is characterized in that the means for control of the ironing temperature and speed comprise a detector device for the temperature of the surface of the ironing cylinder (4) and a control device (23) which varies the speed of the ironing cylinder (4) in function of the temperature detected, and in that the pressure cylinder (6) is floating, its spindle being pushed against lateral stops (8) in the form of an inclined plane provided on the casing of the machine, through the action of the tension of the textile bands (7), thus providing the ironing pressure.

It further comprises perforated tubes (19,20) for vapour discharge, which extend parallel to the ironing cylinder (4), and which emerge into a common chamber (21), from which vapour is discharged by means of a suction device (22).

It permits automatic adjustment of ironing temperature and speed.

FIG. 1



EP 0 528 745 A2

Jouve, 18, rue Saint-Denis, 75001 PARIS
BEST AVAILABLE COPY

The present invention refers to an ironing machine, of simplified construction, which permits the automatic adjustment of the ironing speed in function of temperature, in order to achieve a uniform ironing.

BACKGROUND OF THE INVENTION

Known in the art are ironing machines whose principle is based on an ironing cylinder, provided with a heating system, which can be electrical, by gas or by steam, to keep it at a specific temperature, one or several pressure cylinders laid out parallel to and on top of the ironing cylinder, a plurality of textile bands which convoy the fabric keeping it in contact with the ironing cylinder, and means for control of the ironing temperature and speed.

In said machines the fabric to be ironed passes between the two cylinders, in such a way that they draw the fabric and subject it to an ironing pressure, while the textile bands convoy the fabric keeping it in contact with the ironing cylinder over a large circumference arc.

The control means permit the temperature to be adjusted, by means of a thermostat or the like, according to the type of fabric to be ironed. They also permit adjustment, by means of a potentiometer or mechanical control, of the most suitable cylinder speed according to the fabric to be ironed and according to the preset temperature. Both temperature and speed are thus set manually.

However, this control system does not permit an automatic adjustment of the speed during the ironing operation, in function of the initial humidity of the fabric to be ironed. The variations of humidity lead to variations in the ironing conditions, which in turn produce irregularities in the ironed fabric.

The above mentioned machines also present other drawbacks.

According to one embodiment, both the ironing pressure exercised by the pressure cylinder and the tension of the driving bands are currently achieved using springs, which involves a certain constructional complexity and certain maintenance problems.

According to another embodiment, both ironing pressure and driving bands tension are achieved by the use of relatively heavy cylinders, which increases the cost of construction of the machine.

Finally, known ironing machines include means of suction of the vapours and gases produced during ironing, including a plurality of perforated tubes arranged parallel to the ironing cylinder. However, as these are placed outside the path of the textile bands, they do not provide good suction of the humid air which accumulates around the ironing cylinder. Furthermore, the drawing of the aspirated vapours and gases towards the turbine is carried out by means of cumbersome suction conduits.

DESCRIPTION OF THE INVENTION

The aim of the present invention is to provide an ironing machine which resolves the mentioned drawbacks.

The ironing machine object of the invention is characterized in that the means for the control of ironing temperature and speed comprise a detector device for the temperature of the ironing cylinder surface and a control device which varies the speed of the ironing cylinder in function of the temperature detected and of a preselected reference temperature, so that the speed of the ironing cylinder is increased or reduced automatically when the temperature of the ironing cylinder grows or lowers in relation to the preselected reference temperature.

Thus, once the most suitable temperature for the type of fabric to be ironed has been preselected, the speed adapts automatically to the temperature variations which arise during ironing, caused by variations of the residual moisture of the fabric.

For example, when the fabric is introduced into the ironer it is damp and leads to a reduction of the temperature of the ironing cylinder, which is automatically compensated by reducing the speed of said cylinder. As the fabric dries off, the temperature of the cylinder increases and the control device induces a speed increase. The ironing conditions are thus optimum throughout the process.

It is important to stress that the temperature readings are taken by means of a detector which is in contact with the surface of the ironing cylinder, so that the control device receives a temperature signal which is very close to the real value.

Advantageously, the temperature detector device includes a thermistor embedded in an electrically insulating and thermally conductive material, limited by a metal sheet which is kept in contact with the surface of the ironing cylinder.

The machine of the invention also presents other advantages. Firstly, the pressure cylinder is floating, and the casing includes a first pair of lateral stops in the form of inclined planes, arranged at each end of the pressure cylinder. The spindle of the pressure cylinder is pressed against said first stops by the tension of the bands, the ironing pressure being provided by the vertical component of the force exercised by said first stops on the spindle.

It also comprises a floating roller which guides the bands, and a second pair of lateral stops in the form of inclined planes, provided at each end of the pressure cylinder, forming an angle of between 50 and 80 degrees with respect to the horizontal plane, said bands pushing the spindle of the floating roller against said stops, so that the component of the force exerted by the stops on the roller, in the direction of the bisector of the angle formed by the bands around the roller, provides the necessary tension to the

BEST AVAILABLE COPY

bands and permits the absorption of the different band lengths.

By means of this arrangement of lateral stops in the form of inclined planes it is possible to avoid the use of springs for tensioning the bands and to reduce the weight of the rollers. In particular, the inclination of the second pair of lateral stops permits the floating roller a certain clearance, so that it is able to compensate possible variations in the length of the bands.

Advantageously, the spindle of the pressure cylinder and the spindle of the floating roller rest against the corresponding stops by means of suitable bearings, in order to facilitate their movement.

With the machine of the invention the moist air suction conduits are also simplified, since the perforated tubes, arranged parallel to the ironing cylinder, are not connected by one end to cumbersome suction conduits, but instead emerge into a chamber formed on one side of the machine, from where vapours and gases are discharged by means of a suction device. This arrangement reduces pressure losses.

Advantageously, one of said perforated tubes is arranged adjacent to the ironing cylinder, within the path of the flexible bands. This permits suction of the moist air which accumulates around the ironing cylinder.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of all that has been set forth, there are attached some drawings in which, schematically and only by way of non-limiting example, is shown a practical case of embodiment.

In said drawings,

figure 1 is a perspective view of the ironing machine object of the invention;

figure 2 is a schematic elevation view of the ironing mechanisms of the machine of figure 1;

figures 3a and 3b show the forces involved in the ironing pressure and tensioning of the bands;

figure 4 is a schematic plan view of a detail of the suction system;

figure 5 shows an elevation view of the temperature detector device;

figure 6 shows a detail of the device of figure 5; and

figure 7 shows the control panel of the machine of figure 1.

DESCRIPTION OF A PREFERRED EMBODIMENT

As shown in figures 1 and 2, the ironing machine object of the invention comprises an outer casing -1-, a plurality of input bands -2- to insert the fabric to be ironed into the machine and a tray -3- to collect the fabric once it has been ironed.

Inside the machine, as shown in figure 2, is an ironing cylinder -4-, which is kept to a specific temperature by means of a heating system -5-, and turns driven by a suitable motor and transmission (not shown), a pressure cylinder -6-, resting on the ironing cylinder -4-, and a plurality of continuous textile bands -7-, which at one point of their path are trapped between said two cylinders -4,6-, in such a way that movement is imparted to them and they drive the fabric to be ironed, keeping it in contact with the ironing cylinder -4-.

The bands push the spindle of the pressure cylinder -6- against a first- pair of stops -8- in the form of inclined planes, which are arranged integral to the casing -1- at the two ends of the pressure cylinder -6-, in such a way that the vertical component -V- of the force -Fc- which said stops -8- exercise upon the spindle of the cylinder -6- provides the pressure necessary for the ironing. This forces are shown in figure 3a.

Figure 2 also shows the system which provides the necessary tension to the continuous bands -7-.

The path of said bands is determined by the pressure cylinder -6-, the ironing cylinder -4-, a floating roller -9-, a free-mounted roller -9- and a curved surface -11- over which said bands slide.

The spindle of the floating roller -9- is pushed by the same bands against a second pair of stops -12- in the form of inclined planes, arranged integral to the casing at the two ends of the floating roller -9-, in such a way that the component -B- of the force -Fr- which said pair of stops -12- exercises on the spindle of said floating roller -9-, in the direction of the bisector of the angle -α- formed by the flexible bands -7- around the roller, provides the necessary tension to the bands -7-.

Figure 3b shows these forces.

The inclination of the second pair of stops -12- is of between 50 and 80 degrees with respect to the horizontal plane, for thus, on the one hand, use is made of a large part of the force -Fr- for tensioning the bands -7- and, on the other, the floating roller -9- is permitted a certain amount of clearance, so that variations arising in the length of the bands can be absorbed, avoiding the danger of damage or wear.

The ironing machine includes a detector device -13- for the temperature of the ironing cylinder -4- surface, as shown in figures 5 and 6. Said device -13- is mounted on a support -14- fixed to the casing -1-, and includes a thermistor -15-, embedded in an electrically insulating and thermally conductive material -16-, limited by a metal sheet -17-, which is kept in contact with the surface of the ironing cylinder -4-.

The terminals -18- of the thermistor are connected to a control device which automatically regulates the ironing speed in accordance with the temperature of the surface of the cylinder -4-.

Figures 2 and 4 show the suction system of the machine.

Said suction system includes a first perforated

BEST AVAILABLE COPY

tube -19-, arranged outside the path of the continuous bands -7-, parallel to the cylinders -4- and -6-, which collects the vapours and gases from the interior of the casing -1-, and a second perforated tube -20-, also parallel to the cylinders -4- and -6-, arranged inside the path of the continuous bands -7-, in such a way that it collects the vapours and gases of the zone immediately adjacent to the ironing cylinder -4-, that is, where the largest quantity of vapours accumulates.

The two perforated tubes -19 and -20-, and a third tube not shown in the drawing, which would be used with gas heating, lead out at one end into a chamber -21- formed in one side of the casing -1-, through which vapours and gases are discharged to the outside by means of a suction device -22- such as a turbine.

This suction system has the advantage, compared to other known ones, of drawing a larger quantity of vapours, due to the provision of the perforated tube -20- and to its being subjected to lower pressure losses, due to the presence of the chamber -21-.

Figure 1 also shows the control panel -23- of the machine, a detailed drawing of which is shown in figure 7. The panel essentially comprises a display -24-, on and off keys -25- for the machine and for the ironing cylinder heating system, keys -26- for selecting the ironing temperature, and keys -27- for selecting manual or automatic adjustment of the ironing speed.

The operation of the ironing machine of the invention is essentially as follows: once an ironing temperature suitable for the type of fabric (cotton, synthetic fibres, etc.) to be ironed has been set, when a piece of fabric with a high degree of moisture is inserted the temperature of the ironing cylinder -4- surface falls due to the contact with the fabric; as a consequence, the control means reduce the ironing speed. In the reverse case, with a very dry piece of fabric, the temperature of the cylinder surface -4- will rise, and as a consequence the control means will increase the ironing speed.

The ironing is thus more uniform and does not require adjustment of the speed by the machine operative, while on known machines the ironing speed has to be adjusted manually by the operative for each piece of fabric, in accordance with its degree of humidity.

Although a specific example of embodiment has been described and shown in the drawings, the machine of the invention lends itself to numerous modifications and variations which do not affect its essential nature, and which should be understood to lie within the scope of the invention.

Claims

1. Ironing machine, which comprises an outer casing (1) which contains an ironing cylinder (4) provided with a heating system (5) to keep it at a specific temperature, a pressure cylinder (6), arranged parallel to and above the ironing cylinder (4), a plurality of textile bands (7) which drive the fabric and keep it in contact with the ironing cylinder (4), and means for control of the ironing temperature and speed, characterized in that the means for control of the ironing temperature and speed comprise a detector device (13) for the temperature of the surface of the ironing cylinder (4) and a control device (23) which varies the speed of the ironing cylinder (4) in function of the temperature detected and of the preselected reference temperature, so that the speed of the ironing cylinder (4) increases or reduces when the temperature of the ironing cylinder (4) increases or reduces with respect to the reference temperature.

2. Ironing machine as claimed in claim 1, characterized in that the temperature detector device includes a thermistor (15) embedded in an electrically insulating and thermally conductive material (16), limited by a metal sheet (17) which is kept in contact with the surface of the ironing cylinder (4).

3. Ironing machine as claimed in claim 1, characterized in that the pressure cylinder (6) is floating, and the casing (1) comprises a first pair of lateral stops (8) in the form of inclined planes, provided at each end of the pressure cylinder (6), the spindle of the pressure cylinder being pushed against said first stops (8) by the tension of the textile bands (7), so that the vertical component (V) of the force (Fc) exercised by said first stops (8) on the spindle of the pressure cylinder (6) provides the ironing pressure.

4. Ironing machine as claimed in claim 1, characterized in that it comprises a floating roller (9) which guides the bands (7), and a second pair of lateral stops (12) in the form of inclined planes, provided at each end of the pressure cylinder (6), forming an angle of between 50 and 80 degrees with respect to the horizontal plane, said bands pushing the spindle of the floating roller (9) against said stops, in such a way that the component (B) of the force (Fr) which the stops (12) exercise on the roller (9), in the direction of the bisector of the angle (α) which the bands form around the roller (9), provides the necessary tension to the bands (7) and permits absorption of the various band (7) lengths.

5. Ironing machine as claimed in claims 3 or 4, characterized in that the spindle of the pressure cy-

BEST AVAILABLE COPY

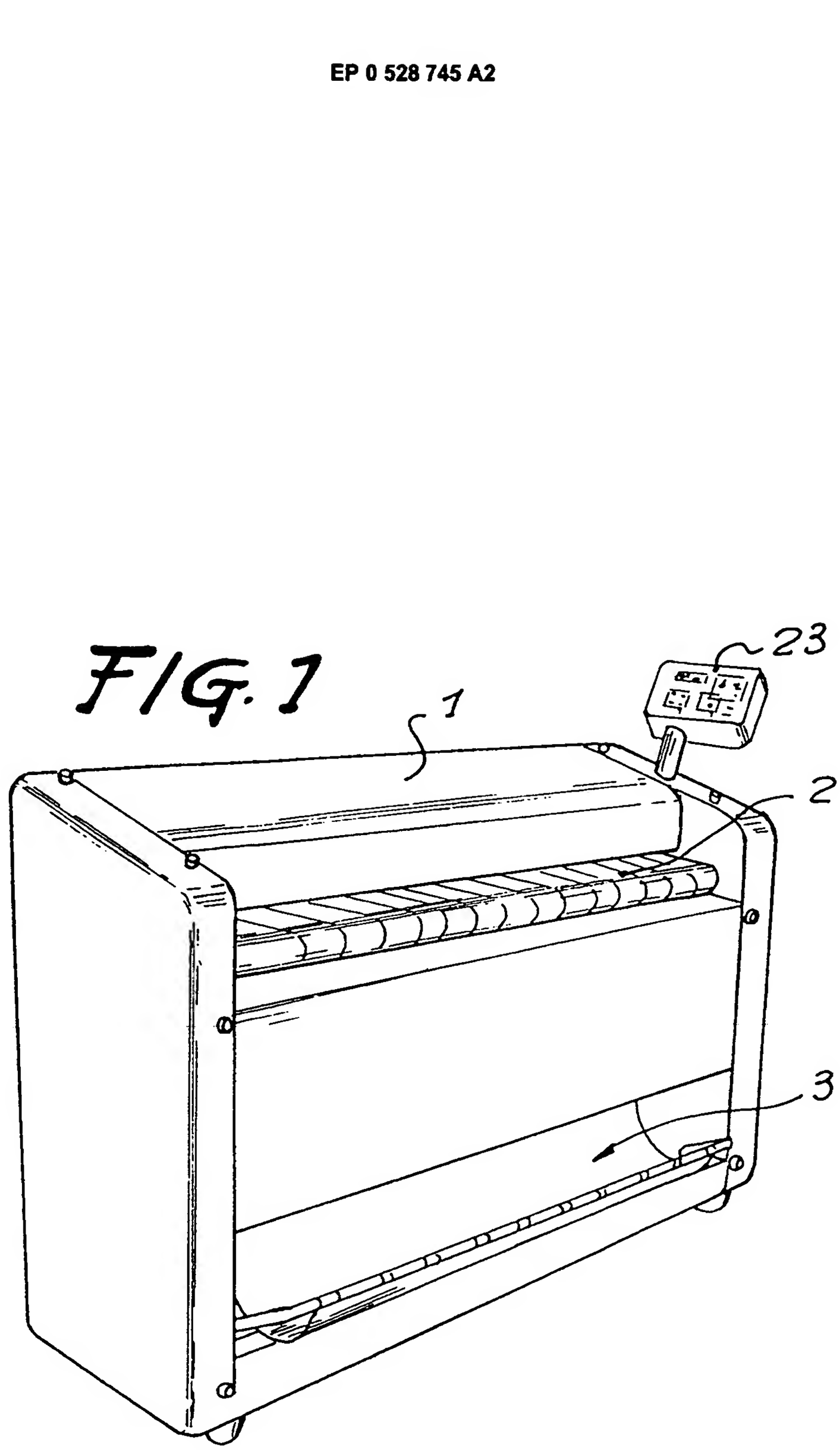
linder (6) and the spindle of the floating roller (9) rest against the respective stops (8, 12) by means of suitable bearings.

6. Ironing machine as claimed in any of the previous claims, which comprises means for suction of the vapours and gases produced during ironing, including a plurality of perforated tubes (19,20), arranged parallel to the ironing cylinder, characterized in that said perforated tubes (19,20) emerge at one end into a chamber (21) formed on one side of the machine, from where vapours and gases are discharged by means of a suction device (22).

7. Ironing machine as claimed in claim 6, characterized in that at least one of said perforated tubes (20) is arranged adjacent to the ironing cylinder (4), within the path of the bands (7).

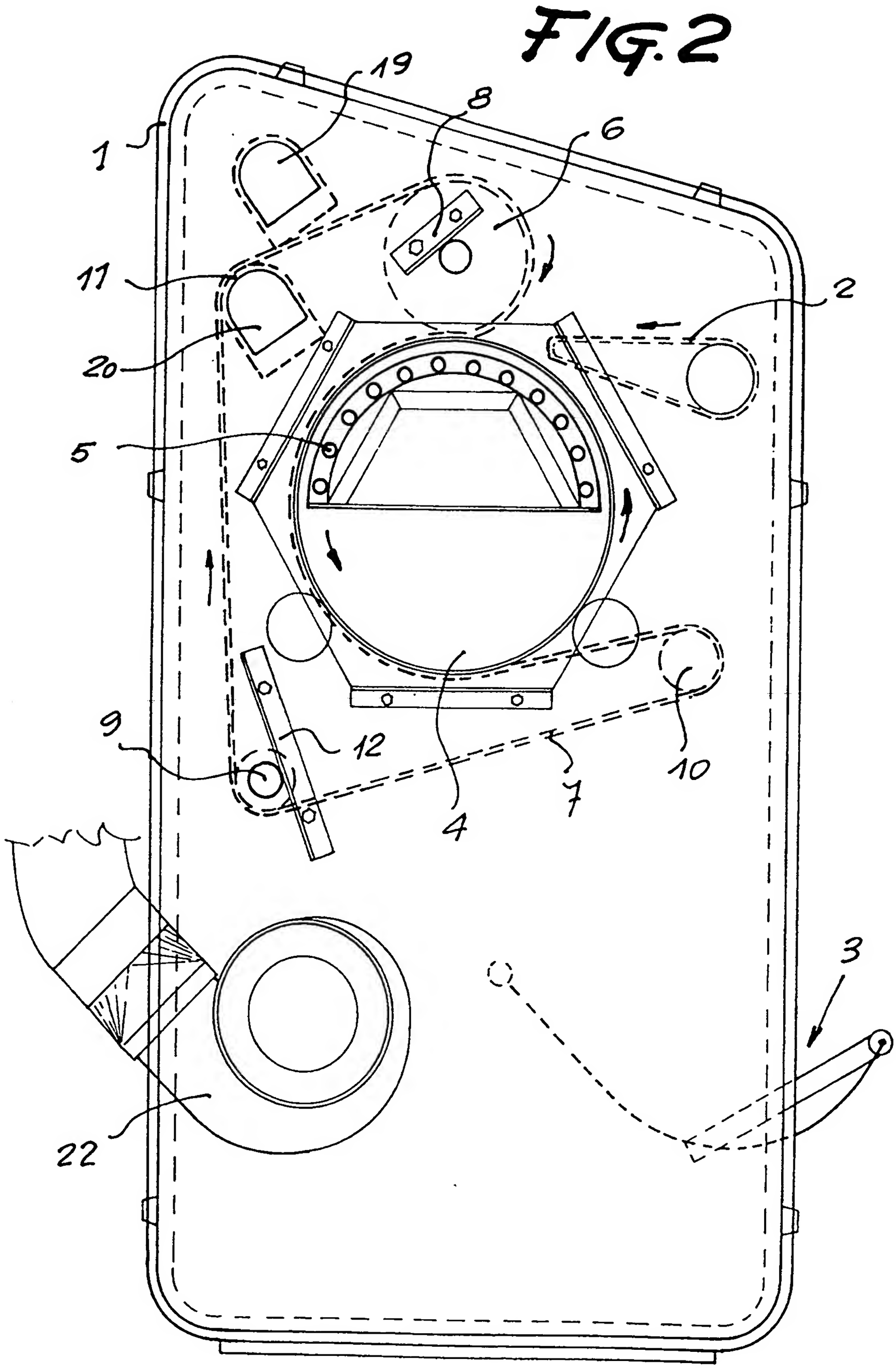
BEST AVAILABLE COPY

FIG. 1



BEST AVAILABLE COPY

FIG.2



BEST AVAILABLE COPY

FIG. 3a

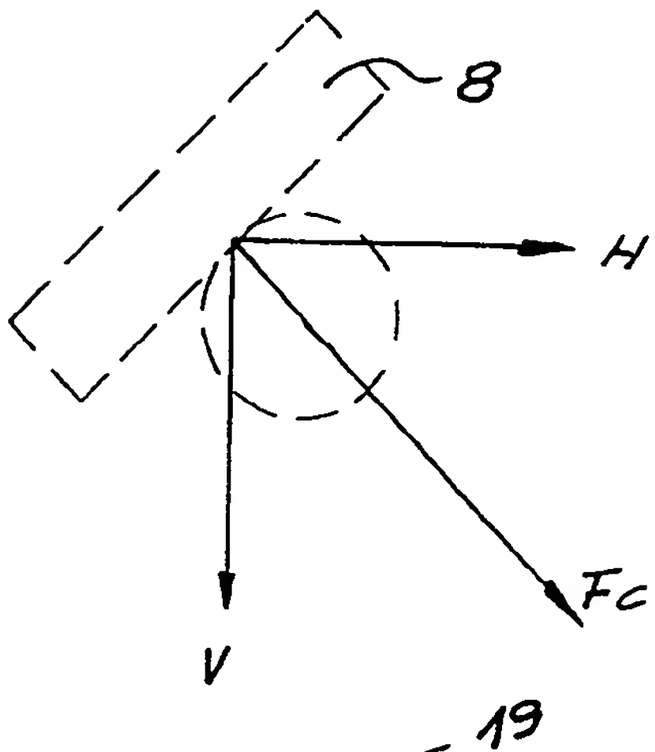


FIG. 3b

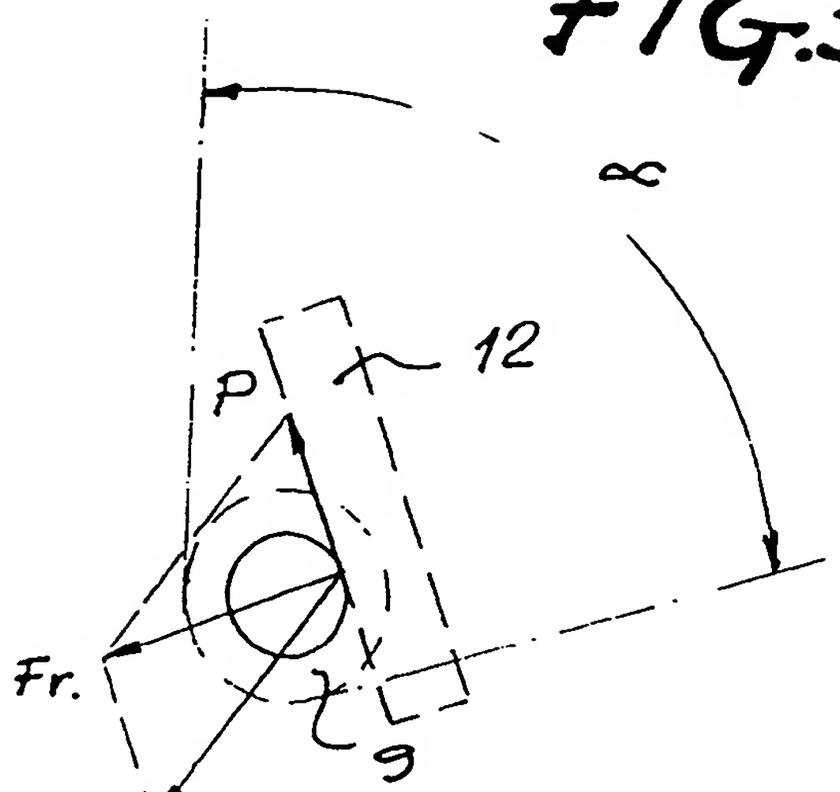


FIG. 4.

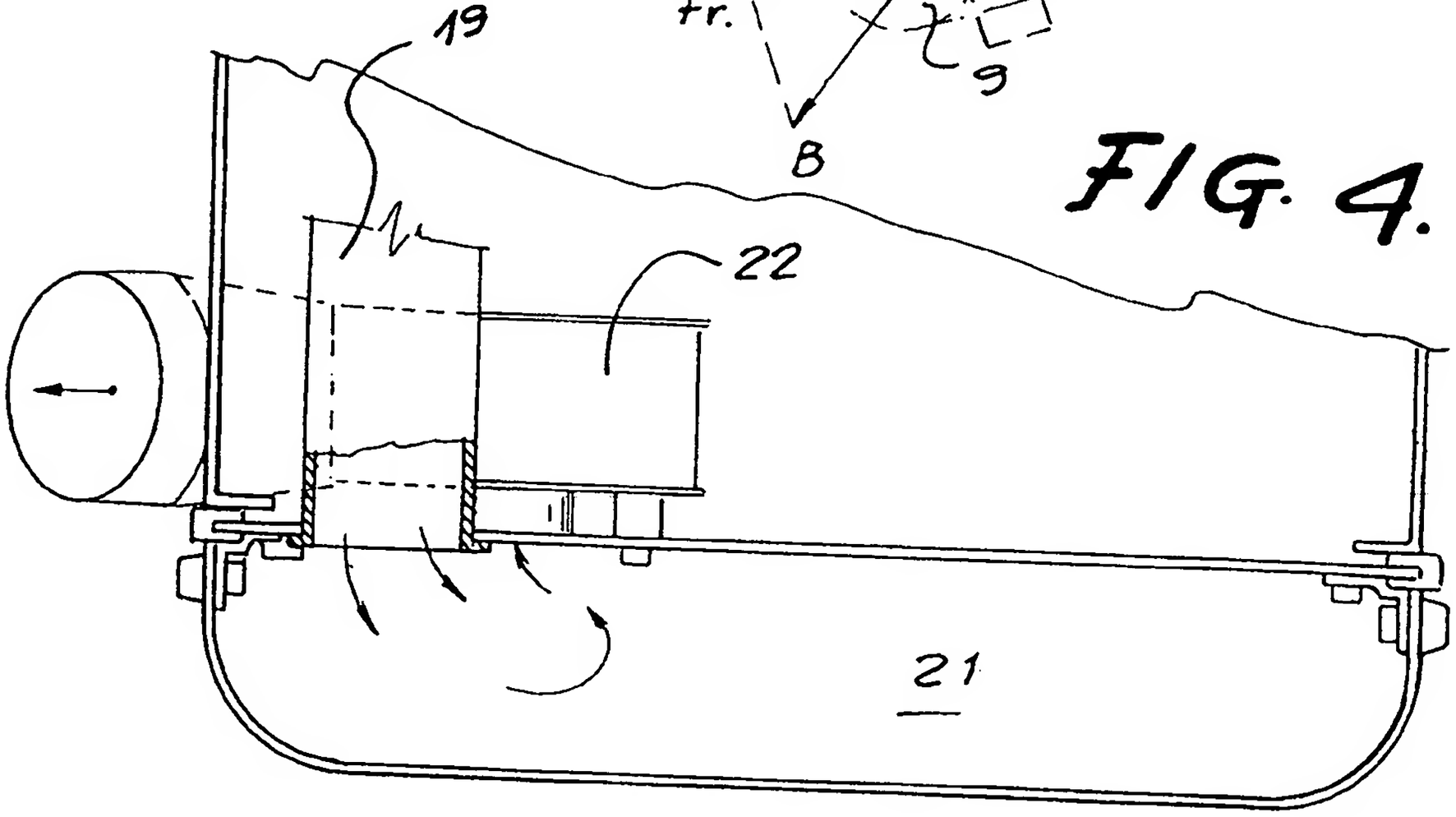
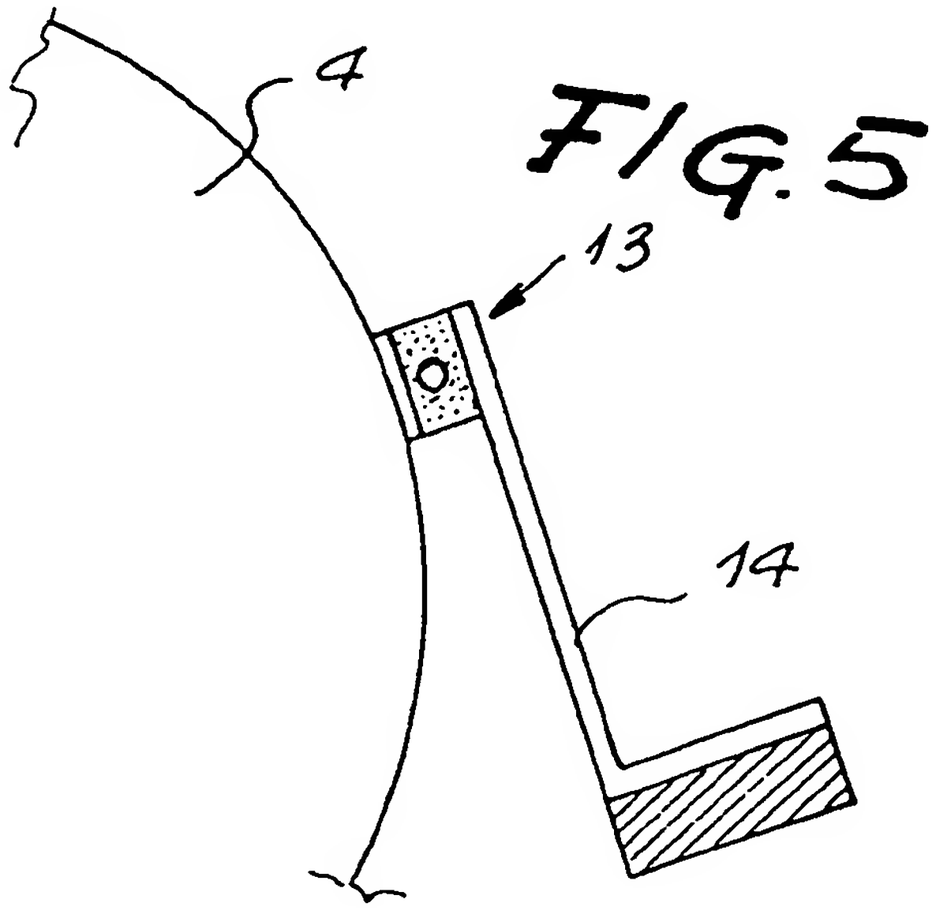


FIG. 5



BEST AVAILABLE COPY

FIG. 6

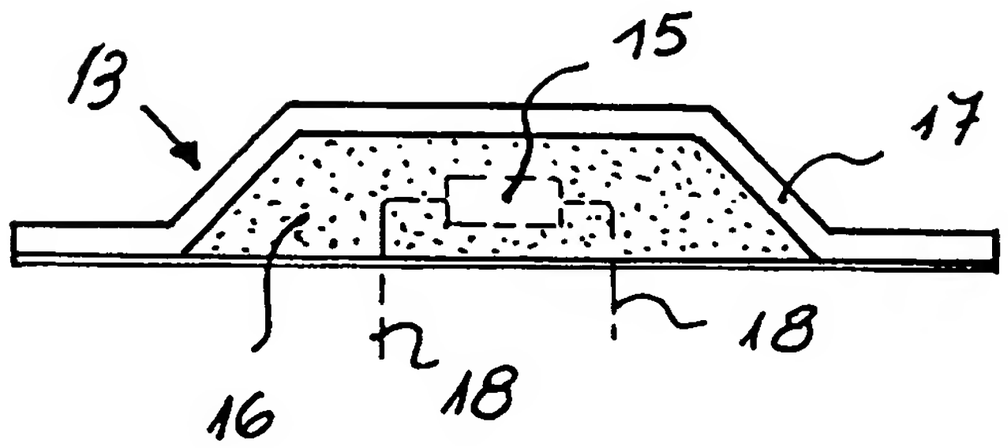
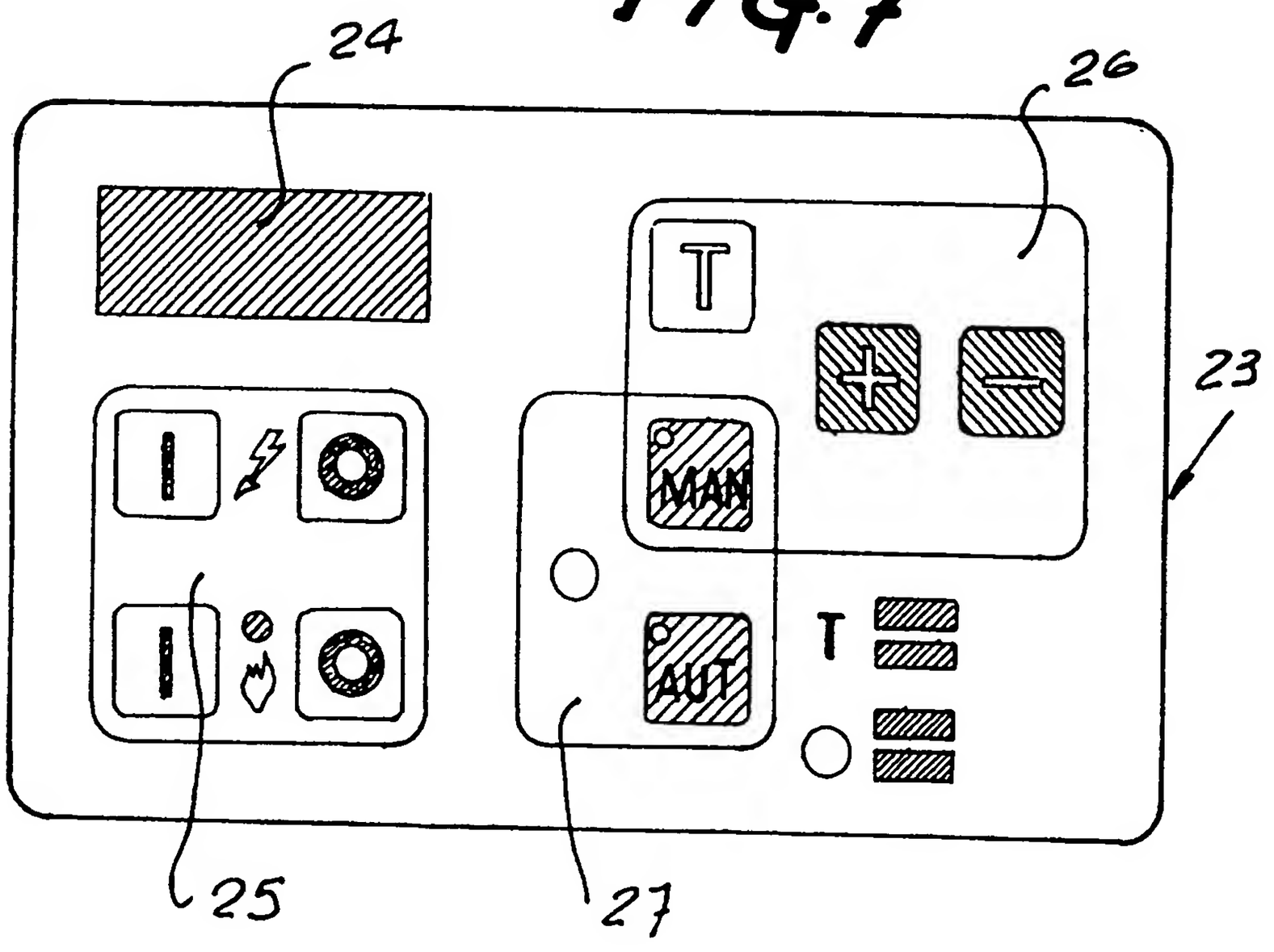


FIG. 7



BEST AVAILABLE COPY